Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (previously presented) A composition comprising:
   (a) a virus-like particle;
   (b) at least one immunostimulatory substance; and
   (c) at least one antigen or antigenic determinant;
   wherein said at least one antigen or antigenic determinant is bound to said virus-like particle, and wherein said immunostimulatory substance is packaged into said virus-like particle, and wherein said immunostimulatory substance is an immunostimulatory nucleic acid, and wherein said antigen comprises at least one HIV polypeptide.

2. (previously presented) The composition of claim 1, wherein said antigen or antigenic determinant is bound to said virus-like particle by at least one nonpeptide covalent bond.

3. (cancelled)

4. (withdrawn-previously presented) The composition of claim 1, wherein said at least one HIV polypeptide is selected from:
   (a) HIV protein subunit p17-GAG;
   (b) HIV protein subunit p24-GAG;
   (c) HIV protein subunit p15-GAG;
   (d) HIV protein subunit Protease;
   (e) HIV protein subunit reverse transcriptase (RT);
   (f) HIV protein subunit Integrase;
   (g) HIV protein subunit Vif;

(h) HIV protein subunit Vpr;

(i) HIV protein subunit Vpu;

(j) HIV protein subunit Tat;

(k) HIV protein subunit Rev

(l) HIV protein subunit gp-41-Env;

(m) HIV protein subunit gp-120-Env;

(n) HIV protein subunit Nef;

(o) Nef-protein consensus sequence (SEQ ID NO: 75);

(p) GAG consensus sequence (SEQ ID NO: 76); and

(q) any fragment of any of the HIV protein subunits or consensus sequences from (a) to (p).

5. (cancelled)

6. (withdrawn-previously presented) The composition of claim 1, wherein said at least one HIV polypeptide has the amino acid sequence of Nef-protein consensus sequence (SEQ ID NO: 75), GAG consensus sequence (SEQ ID NO: 76), or a fragment thereof.

7. (withdrawn-previously presented) The composition of claim 1, wherein said at least one HIV polypeptide comprises an amino acid sequence selected from:

(a) the amino acid sequence of SEQ ID NO: 77;

(b) the amino acid sequence of SEQ ID NO: 78;

(c) the amino acid sequence of SEQ ID NO: 80;

(d) the amino acid sequence of SEQ ID NO: 81;

(e) the amino acid sequence of SEQ ID NO: 82;

(f) the amino acid sequence (SEQ ID NO: 100);

(g) the amino acid sequence (SEQ ID NO: 102),

(h) the amino acid sequence (SEQ ID NO: 114);

(i) the amino acid sequence (SEQ ID NO: 116); and

(j) any fragment of any of the sequences from (a) to (i).

8. (currently amended) The composition of claim 1, wherein said antigen is a combination of at least two HIV polypeptides, wherein said at least two HIV polypeptides are bound to each other directly or by way of a linking sequence.

9. (withdrawn-previously presented) The composition of claim 8, wherein each of said at least two HIV polypeptides are selected from

(a) HIV protein subunit p24-GAG;

(b) HIV protein subunit Nef;

(c) Nef-protein consensus sequence (SEQ ID NO: 75);

(d) GAG consensus sequence (SEQ ID NO: 76);

(e) any fragment of any of the HIV protein subunits or consensus sequences from (a) to (d).

10. (original) The composition of claim 8, wherein said at least two HIV polypeptides are a combination of at least one HIV polypeptide selected from Nef-protein consensus sequence (SEQ ID NO: 75) or a fragment thereof, and of at least one HIV polypeptide selected from GAG-protein consensus sequence (SEQ ID NO: 76) or a fragment thereof.

11. (withdrawn-previously presented) The composition of claim 8, wherein said at least two HIV polypeptides comprise an amino acid sequence selected from:

(a) the amino acid sequence of SEQ ID NO: 83;

(b) the amino acid sequence of SEQ ID NO: 84;

(c) the amino acid sequence of SEQ ID NO: 86;

(d) any fragment of any of the sequences from (a) to (c).

12. (previously presented) The composition of claim 1 or 8, wherein said virus-like particle comprises at least one first attachment site and wherein said antigen or antigenic determinant further comprises at least one second attachment site being selected from the group consisting of:

    (a) an attachment site not naturally occurring with said antigen or antigenic determinant; and

    (b) an attachment site naturally occurring with said antigen or antigenic determinant;

    and wherein said binding of said antigen or antigenic determinant to said virus-like particle is effected through association between said first attachment site and said second attachment site, wherein said antigen or antigenic determinant and said virus-like particle interact through said association to form an ordered and repetitive antigen array.

13. (cancelled)

14. (previously presented) The composition of claim 12, wherein said first attachment site comprises an amino group.

15. (previously presented) The composition of claim 12, wherein said second attachment site comprises a sulfhydryl group.

16. (cancelled).

17. (previously presented) The composition of claim 12, wherein said first attachment site is an amino group and said second attachment site is a sulfhydryl group.

18. (previously presented) The composition of claim 12, wherein said at least two HIV polypeptides with said second attachment site comprise an amino acid sequence selected from:
    (a) the amino acid sequence of SEQ ID NO: 72;
    (b) the amino acid sequence of SEQ ID NO: 85;
    (c) the amino acid sequence of SEQ ID NO: 87; and
    (d) any fragment of any of the sequences from (a) to (c).

19. (previously presented) The composition of claim 1, wherein said antigen or antigenic determinant comprises an amino acid sequence selected from:
    (a) the amino acid sequence of SEQ ID NO: 71; and
    (b) the amino acid sequence of SEQ ID NO: 73.

20. (cancelled)

21. (previously presented) The composition of claim 1, wherein said virus-like particle is a recombinant virus-like particle, wherein said virus like particle comprises recombinant proteins selected from the group consisting of:
    (a) recombinant proteins of Hepatitis B virus;
    (b) recombinant proteins of measles virus;
    (c) recombinant proteins of Sindbis virus;
    (d) recombinant proteins of Rotavirus;
    (e) recombinant proteins of Foot-and-Mouth-Disease virus;
    (f) recombinant proteins of Retrovirus;
    (g) recombinant proteins of Norwalk virus;
    (h) recombinant proteins of human Papilloma virus;
    (i) recombinant proteins of BK virus;
    (j) recombinant proteins of bacteriophages;
    (k) recombinant proteins of RNA-phages;
    (l) recombinant proteins of Ty; and

(m) fragments of any of the recombinant proteins from (a) to (l).

22. (cancelled)

23. (cancelled)

24. (previously presented) The composition of claim 1, wherein said virus-like particle comprises recombinant proteins, or fragments thereof, of a RNA-phage, wherein said RNA-phage is selected from the group consisting of:
    (a) bacteriophage Qβ;
    (b) bacteriophage R17;
    (c) bacteriophage fr;
    (d) bacteriophage GA;
    (e) bacteriophage SP;
    (f) bacteriophage MS2;
    (g) bacteriophage M11;
    (h) bacteriophage MX1;
    (i) bacteriophage NL95;
    (j) bacteriophage f2;
    (k) bacteriophage PP7; and
    (l) bacteriophage AP205.

25. (previously prestented) The composition of claim 1, wherein said virus-like particle comprises recombinant proteins, or fragments thereof, of bacteriophage Qβ or bacteriophage AP205.

26. (cancelled)

27. (previously presented) The composition of claim 1, wherein said immunostimulatory nucleic acid is selected from the group consisting of:

(a) ribonucleic acids;

(b) deoxyribonucleic acids;

(c) chimeric nucleic acids; and

(d) any mixtures of at least one nucleic acid of (a), (b) and/or (c).

28. (cancelled)

29. (cancelled)

30. (previously presented) The composition of claim 1, wherein said immunostimulatory substance is an unmethylated CpG-containing oligonucleotide.

31. (cancelled)

32. (cancelled)

33. (previously presented) The composition of claim 30, wherein said unmethylated CpG-containing oligonucleotide comprises a palindromic sequence.

34. (cancelled)

35. (previously presented) The composition of claim 30, wherein said unmethylated CpG-containing oligonucleotide consists of the sequence GGGGGGGGGGGACGATCGTCGGGGGGGGGG (SEQ ID NO: 41).

36. (cancelled)

37. (cancelled)

38. (cancelled)

39. (cancelled)

40. (cancelled)

41. (cancelled)

42. (currently amended) The composition of claim ~~30~~ 33, wherein said palindromic sequence comprises GACGATCGTC (SEQ ID NO: 1).

43. (cancelled)

44. (cancelled)

45. (cancelled)

46. (cancelled)

47. (cancelled)

48. (currently amended) The composition of claim 1, wherein said antigen comprises a cytotoxic T cell epitope, a Th cell epitope or a combination of at least two of said epitopes, wherein said at least two epitopes are bound to each other directly or by way of a linking sequence, and wherein said cytotoxic T cell epitope is a viral ~~or a tumor~~ cytotoxic T cell epitope.

49. (previously presented) A method for enhancing an immune response against an antigen in an animal comprising introducing the composition of claim 1

into said animal, wherein an enhanced immune response against said antigen is produced in said animal.

50. (cancelled)

51. (cancelled)

52. (cancelled)

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88. (cancelled)

89. (cancelled)

90. (cancelled)

91. (cancelled)

92. (cancelled)

93. (cancelled)

94. (withdrawn-previously presented) The method of claim 49, wherein said immune response is an enhanced B cell response or an enhanced T cell response.

95. (withdrawn-previously presented) The method of claim 49, wherein said animal is a mammal.

96. (withdrawn-previously amended) The method of claim 49, wherein said composition is introduced into said animal subcutaneously, intramuscularly, intravenously, intranasally or directly into the lymph node.

97. (previously presented) A vaccine comprising an immunologically effective amount of the composition of claim 1 together with a pharmaceutically acceptable diluent, carrier or excipient.

98. (withdrawn-original) A method of immunizing or treating an animal comprising administering to said animal an immunologically effective amount of the vaccine of claim 97.

99. (withdrawn-previously presented) The method of claim 98, wherein said animal is a mammal.

100. (cancelled)

101. (cancelled)

102. (withdrawn-previously presented) A method of immunizing or treating an animal comprising the steps of priming a T cell response in said animal, and boosting a T cell response in said animal, wherein said priming or said boosting

is effected by administering an immunologically effective amount of the vaccine of claim 97.

103. (withdrawn-previously presented) The method of claim 102, wherein said priming and said boosting is effected by administering an immunologically effective amount of ~~a~~ said vaccine of claim 97.

104. (withdrawn-currently amended) An isolated polypeptide comprises an amino acid sequence selected from:

(a) ~~the amino acid sequence of SEQ ID NO: 77;~~

(b) ~~the amino acid sequence of SEQ ID NO: 78;~~

(c) ~~the amino acid sequence of SEQ ID NO: 80;~~

(d) ~~the amino acid sequence of SEQ ID NO: 81;~~

(e) ~~the amino acid sequence of SEQ ID NO: 82;~~

(~~f~~ a) the amino acid sequence of SEQ ID NO: 83;

(~~g~~ b) the amino acid sequence of SEQ ID NO: 84;

(~~h~~ c) the amino acid sequence of SEQ ID NO: 86;

(~~i~~ d) the amino acid sequence of SEQ ID NO: 72;

(~~j~~ e) the amino acid sequence of SEQ ID NO: 85;

(~~k~~ f) the amino acid sequence of SEQ ID NO: 87;

(~~l~~ g) the amino acid sequence of SEQ ID NO: 71;

(~~m~~ h)the amino acid sequence of SEQ ID NO: 73; and

(~~n~~ i) an amino acid sequence having at least 90% sequence identity to any of the amino acid sequences of (a) – (~~m~~ h) and being capable of being presented in a MHC complex.

105. (cancelled)

106. (cancelled)

107. (cancelled)

108. (withdrawn-previously presented) The method of claim 94, wherein said T cell response is a CTL response or a Th cell response.

109. (withdrawn-previously presented) The method of claim 108, wherein said Th cell response is a Th1 cell response.

110. (withdrawn-previously presented) The method of claim 95, wherein said mammal is a human.

111. (previously presented) The vaccine of claim 97, wherein said vaccine further comprises an adjuvant.

112. (withdrawn-previously presented) The method of claim 99, wherein said mammal is a human.

113. (new) The composition of claim 1, wherein said at least one HIV polypeptide consists of an amino acid sequence selected from:

(a) the amino acid sequence of SEQ ID NO: 77;
(b) the amino acid sequence of SEQ ID NO: 78;
(c) the amino acid sequence of SEQ ID NO: 80;
(d) the amino acid sequence of SEQ ID NO: 81;
(e) the amino acid sequence of SEQ ID NO: 82;
(f) the amino acid sequence of SEQ ID NO: 100;
(g) the amino acid sequence of SEQ ID NO: 102,
(h) the amino acid sequence of SEQ ID NO: 114;
(i) the amino acid sequence of SEQ ID NO: 116; and
(j) any fragment of any of the sequences from (a) to (i).

114. (new) An isolated polypeptide consists of an amino acid sequence selected from:

(a) the amino acid sequence of SEQ ID NO: 77;

(b) the amino acid sequence of SEQ ID NO: 78;

(c) the amino acid sequence of SEQ ID NO: 80;

(d) the amino acid sequence of SEQ ID NO: 81;

(e) the amino acid sequence of SEQ ID NO: 82;

(f) the amino acid sequence of SEQ ID NO: 83;

(g) the amino acid sequence of SEQ ID NO: 84;

(h) the amino acid sequence of SEQ ID NO: 86;

(i) the amino acid sequence of SEQ ID NO: 72;

(j) the amino acid sequence of SEQ ID NO: 85;

(k) the amino acid sequence of SEQ ID NO: 87;

(l) the amino acid sequence of SEQ ID NO: 71;

(m) the amino acid sequence of SEQ ID NO: 73; and

(n) an amino acid sequence having at least 90% sequence identity to any of the amino acid sequences of (a) – (n) and being capable of being presented in a MHC complex.

115. (new) The composition of claim 1, wherein said virus-like particle is a virus-like particle of an RNA-bacteriophage Qβ.

116. (new) The composition of claim 30, wherein said virus-like particle is a virus-like particle of an RNA-bacteriophage Qβ.

117. (new) The composition of claim 35, wherein said virus-like particle is a virus-like particle of an RNA-bacteriophage Qβ.

118. (New) The composition of claim 12, wherein said virus-like particle is a virus-like particle of an RNA-bacteriophage Qβ, wherein said at least one

antigen or antigenic determinant is bound to said virus-like particle by at least one nonpeptide covalent bond, and wherein said first attachment site comprises an amino group and wherein said second attachment site comprises a sulfhydryl group.